

Steel Trades of the West of Scotland, he enjoyed the confidence of both masters and men. He also took an active interest in the West of Scotland branch of the British Astronomical Association, of which he was honorary vice-president at the time of his death.

In 1910 Dr. Dyer received the honorary degree of LL.D. from the University of Glasgow, and in 1915 the degree of Doctor of Engineering from Japan. In 1882 he was decorated with the Japanese Order of the Rising Sun (Class III.), and a few years later with the Order of the Sacred Treasure (Class II.).

In addition to many contributions to periodical literature, Dr. Dyer wrote a number of important books, of which the best known is "Dai Nippon, the Britain of the East." In this volume he traces the rise and progress of Japan in economics, industries, and education, very naturally devoting considerable attention to the work of his own College of Engineering.

His other published works deal with such questions as science teaching in schools, education and national life, the evolution of history, and the like.

Dr. Dyer's many friends and associates can look back upon the record of a life well spent in the highest educational activities and in furthering the interests of the community among whom he lived. His was a strong personality actuated by a single-hearted enthusiasm in the cause of scientific training. C. G. K.

NOTES.

We learn with much satisfaction that the report of the death of the distinguished philosopher, M. Emile Boutroux, member of the Institute of France and of the French Academy, is incorrect.

In the *Times* for October 5 there appears a short notice concerning the latest Halberstadt biplane, quoting a report on this machine prepared by the Technical Department of the Air Ministry. It is exceedingly gratifying to read that the performance of the above machine is poor when compared with our own machines of a similar class, especially when it is remembered that the particular aeroplane on which the report is based was captured so late as last June, and bears the date April 14, 1918, stamped on various parts. Some figures relating to speed and climb are given in the *Times*, but, unfortunately, the weight of the machine is not stated, so that their full significance is not apparent. The speed is given as ninety-seven miles an hour at 10,000 ft. with the 180-h.p. Mercédès engine, and the times given for climbs to various heights indicate a climbing speed of about 600 ft per minute at ground-level. If the weight of the machine were 2700 lb., a likely figure for such an aeroplane, one would expect a climb in the neighbourhood of 1000 ft. per minute at ground-level with the above horse-power, and this rough figure gives some idea of the relative merits of our own two-seater fighters and this recent German machine. The Halberstadt is considered easy to fly and quick in manœuvrability, but these qualities cannot be used to the best advantage in a machine the speed and climb of which are low. The report in question is of great interest, since it establishes in a very direct manner the superiority of our machines over

those of the enemy, and there seems little doubt that this superiority, once definitely gained, will be easily maintained in the future.

THE RIGHT HON. H. A. L. FISHER, President of the Board of Education, will preside at a meeting to be held at the Royal Society of Arts on Monday, October 28, at 3 p.m., when a scheme for the promotion of industrial art will be submitted for consideration. Amongst those who have consented to speak are Lord Leverhulme, Sir Charles Allom, Sir Woodman Burbidge, Mr. Kenneth Lee, Sir William McCormick, Mr. Gordon Selfridge, and Sir Frank Warner. The prime objects of the scheme are:—(1) To encourage and co-ordinate movements towards the development and improvement of industrial art, with the view of maintaining for the trade of the British Empire its position in the markets of the world; (2) to co-operate with Government Departments and other bodies in promoting exhibitions, and in particular with the Government scheme for a British Institute of Industrial Art; and (3) to initiate and encourage research, experimental and other work germane to the objects above indicated, to award grants for conducting such work, and to co-operate, whenever possible, with Government and other institutions founded for such purposes.

AN Exhibition of New British and "Key" Industries, organised by the Industrial Section of the Tariff Reform League, was opened at the Central Hall, Westminster, on October 7, and will remain open until October 22, when the intention is to take it to Manchester and other large provincial centres of population. The exhibition is on a smaller scale than that recently organised at King's College by the British Science Guild, to which appreciative reference is made by Mr. H. J. Mackinder in his introduction to the official handbook, and little is included which was not represented in that exhibition. On the scientific side, therefore, there is nothing to record which has not been described already in these columns. Among the exhibits of new or revived British industries are flags, Christmas cards, dolls, toys, puzzles, indoor games, and picture-frame mouldings, which were outside the field of the British Scientific Products Exhibition. The handbook, price 1s. net, contains instructive articles upon the occurrence and uses of metals and other substances essential to the existence of many great industries, and controlled by enemy influence before the outbreak of the war. The fact that we were dependent upon Germany for many products and appliances which we were fully capable of manufacturing ourselves is beyond dispute, but it must remain a matter of opinion as to whether the conclusions of the Tariff Reform League as to its chief cause are correct. The exhibition is, however, an enlightening display of national scientific and industrial effort, and as admission is free there will no doubt be many visitors to it.

DR. ADDISON, Minister of Reconstruction, in his inaugural address at the opening of the Pharmaceutical Society's School of Pharmacy on Wednesday of last week, laid stress upon the need for co-ordination of scientific knowledge and for a thorough and scientific treatment of facts and inquiries. The greatest danger before and during the war was German organisation, training, and method, especially in the application of physical science; to safeguard ourselves in the future it was necessary to provide better training and better conditions of life. At the outbreak of war we were faced with difficulties consequent upon our dependence on Germany for the supply of a large number of medicinal chemicals, as

well as of certain medicinal herbs, and Dr. Addison described the methods by which these difficulties were overcome, with the result that not only did we succeed in satisfying ourselves, but we were also in a position to supply our Allies and to export to certain neutral countries. The particular lesson to be learnt was that we must have a much better supply of trained chemists, and to get this supply and maintain it a sufficient number of well-paid and suitable posts must be assured. Chemical science and industry must be completely reorganised. Science must not be bottled up in laboratories, but given a wider range and more freedom. However, with all that we plan and arrange, we must never forget that our national strength ultimately resides in the vitality, independence, initiative, and character of individual citizens.

THE announcement that within the last few days there has been direct wireless communication between Great Britain and Australia must not be exaggerated into an achievement heralding the immediate approach of direct wireless communication between the two countries. It is unnecessary to point out here that, under certain abnormally favourable conditions combined with an element of luck, signals can be heard over remarkably long distances. On more than one occasion, when such signals have been heard over long distances, the feat has been allowed to become unconsciously exaggerated in the public mind, and the science of wireless telegraphy has not thereby been advanced. It is not the first time that reports have been issued of wireless communication with the Antipodes. During 1917 a wireless operator at Invercargill, New Zealand, is said to have found no difficulty in reading messages transmitted from the Eiffel Tower, in Paris, and Coltano, near the Italian Riviera. Possibly developments have taken place during the war (about which nothing has been said, and very properly too) which are bringing us nearer satisfactory and trustworthy commercial long-distance wireless working over ranges indicated in recent Press announcements. It appears that in Germany, too, the problem of long-range working has been receiving attention. In a recent description of the Nauen station it was stated that the equipment had been so enormously developed during the war that it was now capable of working over a range of 6200 miles. The quiet scientific work essential to the solution of problems that have hitherto made commercial working over very long ranges an impossibility has been practically in abeyance during the war, and until we know what has been accomplished under the veil of secrecy it is wiser not to assume too much from the announcements appearing in the Press.

THE June issue of *The Central*, the journal of the Old Students' Association of the City and Guilds College, contains an article on the organisation of the technical worker. Since, first, the manual workers and, later, the employers have formed unions or associations for their mutual protection, there is a rapidly increasing sentiment amongst technical workers that their interests would be best advanced by the formation of some protective association. The older technical societies do not concern themselves with the material advance of their members, and they have been, on the whole, somewhat slow to act in the interests of the professions they represent during the many changes of the last few years. The question whether scientific and technical workers should form a union is a vexed one, the more so since involved in it is the very difficult subject of the definition of a chemist or an engineer. The chemists have been the first in the field to form a professional union, and two rival bodies are already constituted, the British Association of

Chemists and the National Association of Industrial Chemists. In addition, the Institute of Chemistry has increased its activities and made a very proper attempt to open its membership to all genuine chemists—using the term to indicate the fully qualified chemist comparable with the lawyer or the doctor of medicine. Unfortunately, this has failed, and the founders of new organisations have persisted in their formation, although they will not be representative of the properly qualified chemists. The proposed National Union of Scientific Workers has less trouble in deciding the qualifications of candidates for membership, and if it is successful in any way in obtaining recognition of the proper place of scientific work in the national life, it certainly merits support. It is, at any rate, clear that the days of aloofness and isolation, which have been a characteristic of our scientific societies in the past, will have to give way to a spirit of helpful co-operation if the societies are to make their valuable influence felt by the nation.

THE death is announced, on October 2, in his fifty-fifth year, of Mr. John Briggs, principal of University Tutorial College, London.

DR. PERCY KIDD will deliver the Harveian oration at the Royal College of Physicians of London on Friday, October 18, at 4 p.m.

THE first annual Streatfeild memorial lecture will be delivered on Thursday, October 17, at 4 o'clock, at the City and Guilds Technical College, Finsbury, by Prof. W. J. Pope, who will take as his subject "The Future of Chemistry." No charge will be made for admission.

DR. C. ADDISON, Minister of Reconstruction, will give an address on "Principles of Reconstruction" at 4.30 on Wednesday, October 16, in the Saddlers' Hall, Cheapside. The lecture will be the second of the series arranged for by the Industrial Reconstruction Council.

A WAR relief fund for the purpose of restoring the gardens and orchards in France, Belgium, and Serbia which have been destroyed by the enemy has been opened by the Royal Horticultural Society. Sir H. Veitch, the honorary treasurer, will be glad to receive contributions to the fund. They should be sent to him at Room 39, 17 Victoria Street, S.W.1.

CAPT. SIR CHARLES BATHURST, K.B.E., who has been Parliamentary Secretary to the Ministry of Food since the beginning of last year, and has done very valuable service for the promotion of agriculture for many years, has had a peerage of the United Kingdom conferred upon him by the King. It is understood that he will represent the Ministry of Food in the House of Lords.

THE Committee of the Ramsay Memorial Fund (to which the Italian Government has granted 300l. a year for ten years to establish Ramsay memorial fellowships in chemical science, tenable in the United Kingdom by chemists from Italy) announces that H.R.H. the Prince of Wales has consented to accept the position of patron of the fund, which was inaugurated in 1916 to raise the sum of 100,000l., and that it is proposed to raise 50,000l. of the amount by a Million Shilling Fund, which will be devoted to (1) the provision of Ramsay research fellowships, tenable wherever the necessary equipment may be found; and (2) the establishment of a Ramsay memorial laboratory of engineering chemistry in connection with University College, London.

Donations should be sent to Lord Glenconner, the honorary treasurer of the fund, at University College, Gower Street, W.C.1.

WE regret to record the death of the Rev. Edward Frank Sampson, student of Christ Church, Oxford, which took place at Clifton on October 1. Mr. Sampson was born at Bristol in 1848, and educated, under the late Dr. Caldecott, at the Bristol Grammar School, whence he proceeded in 1865 to St. John's College, Oxford, having been elected to a Bristol scholarship in mathematics. He had a very successful career as an undergraduate, taking first classes in Mathematical Moderations and the two Final Schools of Mathematics and Natural Science; and in 1869 he was elected to a clerical senior studentship at Christ Church, being appointed lecturer in mathematics in 1870 and a tutor of the house in 1874. He was a good and sound, though not a brilliant, mathematician, and a painstaking, conscientious, and efficient teacher, many of his pupils owing him deep gratitude for the unstinted help, pecuniary and other, that he gave them. But his chief interest did not lie in mathematics and its developments. He was an administrator and reformer, with a very deep sense of the duty he owed to undergraduates both as tutor and cleric. He was a man of great energy and tenacity, and his position as one of the censors of the house, to which office he was appointed in 1877, greatly helped in the promotion of necessary reforms. Ill-health caused Mr. Sampson to resign the censorship in 1894, and in 1900 he retired from active college work.

THE University of Pennsylvania is devoting special attention to a scientific analysis of North American Indian dialects. The last contribution on this subject is an elaborate monograph by Dr. Franz Boas on the language of the Tlingit Indians, published in vol. viii., No. 1, of the University Anthropological Publications. The material has been collected by Mr. Louis Shotridge, a full-blood Chilkat Indian, and it has been arranged by Dr. Boas, the leading expert in this branch of philology. The difficulty of reproducing in type the complicated system of transliteration necessary to represent the sound-forms has been skilfully surmounted.

A VERY able account of the habits of the sparrowhawk during the nesting period, by Mr. J. H. Owen, appears in *British Birds* for September. Among other things, Mr. Owen comments upon the very long time an egg takes to hatch after the embryo has chipped the shell. Out of eleven eggs kept under observation, six took two days to hatch. In another case the hen was seen to assist the chick to emerge by breaking away the shell. Though the author believes that the cock determines the site of the nest, he seems never to take any part in incubation, but during this time he hunts for the hen, bringing her food to the vicinity of the nest. Though more than three hundred victims have been more or less certainly identified at such nests, only two were game-birds; one of these was a nestling red-legged partridge, the other a pheasant, also in down. Although farmyard chicks were abundant in the neighbourhood of the nests under observation, none were ever taken by these birds, and this is a point worth noting. Finally, Mr. Owen remarks striking differences in the behaviour of sparrow-hawks when disturbed at the nest, some stealing off silently, others leaving with much screaming, the male also taking part in such protests.

In the current issue of the *Quarterly Journal of Microscopical Science* (vol. lxi., part 2) Mr. J. Bronté Gatenby gives a very useful summary of our know-

ledge of the remarkable phenomenon of polyembryony as met with in the parasitic Hymenoptera. Many of these insects, as is well known, deposit their eggs within the eggs of other insects, the young parasite following out its own development in the body of the larval host. This development is often of a very singular character, for from a single egg a large number of individuals may be formed by a process of embryonic budding. Not less interesting is the manner in which enveloping membranes are formed around the developing mass. In the first place, a nutrient envelope, the tropho-amnion, is derived from the polar bodies of the parasitic egg, the nuclei of which divide for the purpose, while an outer covering, of an epithelial character, is formed from certain cells of the host. The larval parasites feed upon the internal organs of the larval host, apparently taking care not to injure it vitally until they no longer require it, when they pupate, either inside or outside the dead larva.

In the Proceedings of the Geologists' Association (vol. xxix., p. 46, 1918), Mr. Arthur L. Leach brings forward very interesting evidence of the occupation of the submerged forest-lands off the coast of Pembrokeshire by flint-chipping man before the full growth of the forest-trees. This occupation may date from early Neolithic times, and a minimum coastal subsidence of 30 ft. has since occurred.

MR. EDWIN KIRK (*Amer. Journ. Sci.*, vol. xlv., p. 511, 1918) records successive epochs of glaciation in Alaska in past geological times, including what is believed to be the first record of Silurian "tillite." The conglomerates on the Alaskan border, previously described by Cairnes (1914) as probably of Permian-Carboniferous age, are shown to be paralleled by others that lie between high Carboniferous and Triassic horizons.

AN important contribution to our knowledge of the Cretaceous strata of the southern hemisphere is made by Sr. Anselmo Windhausen in the *Boletín de la Academia Nacional de Ciencias en Cordoba (Argentina)* (vol. xxiii., p. 97, 1918). Under the name "Neocomiano" the whole Lower Cretaceous sequence in the Argentine Cordillera is reviewed, and the free interchange of marine forms between this region and the Himalayas is pointed out in its geographical significance.

DURING the summer Dr. Arnold Romberg has made some interesting seismometric experiments at the Hawaiian Volcano Observatory (*Weekly Bulletin*, vol. vi., 1918, pp. 87-92). A new upright pendulum has been built for determining the direction from which local earth-waves proceed. A short-period, highly damped horizontal pendulum with heavy mass has been arranged, recording optically on bromide paper running at high speed. By closing up the lines on the drum, this can be done without much additional expense. This instrument has already given a clear, open record of a local earthquake. Another change promises to reduce the friction of the pointer in the smoked-paper mode of registration. A new stylus has been made, consisting of a lever of an extremely light and fine glass tube with a minute sharp-edged watchwork wheel rotating at the end in a glass bearing, the wheel itself being the writing-pen.

THE report on the mineral resources of the Philippine Islands for the year 1916 has just been issued by the Division of Mines of the Government of the Philippine Islands. The only product of any importance is gold, the output of which is valued at 307,450l., the highest figure yet reached. It is in-

interesting to note that a small quantity of manganese ore, namely, 3000 tons, has been produced and shipped to Japan. It is also noteworthy that a small cement plant, with a capacity of 500 barrels per day, has been installed, and has been at work at Rizal since 1915; the cement made is said to be of highly satisfactory quality. A good deal of prospecting and exploratory work is being done, and the coal outlook in particular is well spoken of. It is stated that the Batan coalfield is to be reopened, and that it is possible that this will become the main centre of production; the Cebu and Danao fields are also attracting attention.

We have received a copy of the first number of the *Decimal Educator*, a quarterly publication of the Decimal Association. The principal objects of this new periodical will be to secure the adoption of a decimal system of coinage and the compulsory introduction of the metric system of weights and measures, and also to advocate improved decimal methods in education and business. The first article is an historical sketch of the Decimal Association, in which attention is directed to the important part played by the association in securing the appointment of the Select Committee of 1895, charged with inquiring into the question of metric weights and measures, and to the vigorous campaign waged by the association in the early years of the present century, which resulted in the Metric Bill of 1906. The Act of 1897, which legalised the use of metric weights and measures in trade, was also to a large extent due to the exertions of the association. Another article, on teaching the metric system, protests against the unreasonable stress which many text-book writers lay upon tedious and unpractical conversions from one system of weights and measures to another, and calls for a revision of the present methods of teaching the metric system. On the whole, this new publication promises to be a useful auxiliary to the metric and decimal cause.

VOL. IX. of *Technology*, the journal of the Manchester Municipal College of Technology, is a quarto volume of nearly 260 pages, and consists mainly of reprints of nineteen scientific and technical papers by members of the staff which appeared in journals and proceedings during the year 1915. The papers cover a wide field, from education and the labour problem to the construction of sewers and the abolition of smoke. They all bear more or less on the industries of the district, and show what an important asset the country possesses in an institution of this kind. As a typical paper, that of Mr. S. Evans may be mentioned. It deals with a score of cases in which some metal portion of a manufacturing plant had failed owing to causes not at once apparent. In each case the steps taken to investigate the cause of the trouble are described and the remedy found. The saving in money and time effected by investigations of this kind is enormous; it could safely be put down as several hundred times the salaries of the whole of the staff of the college. The greater the number of colleges in the country capable of turning out so creditable a year's work as this volume represents, the better.

SOUTHPORT stands in the forefront for borough meteorological observations under the superintendence of Mr. Joseph Baxendell. The report of the Fernley Observatory for 1917, just issued, gives detailed observations which are very suggestive to other borough councils which are aiming to be of service in the varied interests of meteorology. Many of the matters discussed are obtainable only by steadily observing the different elements for a number of years. A useful and valuable table is given showing for practically all the health resorts in the British

Isles the "comparative statistics for the year 1917." Some of the special features of interest at Southport in 1917 are the unprecedented low mean and extreme barometric pressures in August, the unusually dry period for nine weeks from June 7 to August 7, and the warm summer following a cold winter, which is mentioned as exemplifying the statement made by old writers. December had the highest mean barometric pressure of any corresponding month since the year 1879. In addition to tables of all ordinary elements, tables are given showing the amount and frequency of rainfall with different wind directions, and there are now added hourly averages of rainfall and sunshine for a term of years. Observations are supplied to the Meteorological Office and to the British Rainfall Organisation. Both the old and the new units of measurement are used in the tables, and if any criticism can be made it is that in such cases as the air temperature the use of both Fahrenheit and Absolute temperatures leads somewhat to confusion. The remarkable "discontinuity" in the seasonal rainfall records shown in the preceding report for 1916 has been interrupted in 1917 by the exceptionally heavy rains of August, with an excess of 2.55 in., and October, with an excess of 2.97 in., but the decreased rainfall in July and September is well maintained.

SEVEN years' experience in the Austrian Government Telegraph Department has led a writer in *Chemiker Zeitung* for August 3 to recommend zinc fluorides as a preservative of wooden poles. It compares favourably with copper sulphate. When complete impregnation of the wood is unnecessary, a partial application of sodium fluoride will be found to exhibit great preservative action.

L'Industria for July 15 describes a new method for the electrolytic extraction of copper from pyritic ashes. The method is based on the electrolytic conversion of sulphide or sulphate of copper into cupric or cuprous chloride by the action of chlorine at the anode. If in an electrolytic bath containing hydrochloric acid in solution the anode is surrounded by a mass of pyritic scoria, the chlorine liberated by the hydrogen attacks the oxides, sulphates, or sulphides of copper more rapidly than the oxides of iron, and combines with them to form cupric chloride. This reaction extends to the entire mass of scoria, so that the latter acts as an electrode. The copper loss by this method is only 0.1 per cent. A simple type of apparatus for applying the process industrially is described.

THE permeameter devised by Mr. F. P. Fahy, of the Pennsylvania Railway Co., and described in the *Electrical World* a year ago, has been subjected to severe tests at the U.S. Bureau of Standards, and the report on it appears in the Bulletin of the Bureau for June. The instrument consists of an H-shaped iron core, on the cross-bar of which the main magnetising coil is wound. The magnetomotive forces between the top or bottom ends of the two upright limbs can be measured by two uniformly wound solenoids with their ends close up to the ends of the limbs. If one pair of core-ends is joined by a bar of magnetisable material, the magnetomotive force between the two ends is reduced. By means of compensating coils wound round the vertical limbs of the yoke near their ends, it may be brought up to its normal value. The magnetising force and the magnetic induction are then determined from the electromotive forces induced in the top and bottom solenoids on reversal of the magnetising current. For accuracy and consistency the Bureau regards the instrument as a distinct advance on previous permeameters.

MESSRS. ILFORD, LTD., referring to the article by Mr. Chapman Jones, in *NATURE* of October 3, on colour sensitised plates, write to say that the filter used for the photographs mentioned in the article was not a yellow filter, but their pale green filter No. 240, specially introduced for use with their special rapid panchromatic plate. Mr. Chapman Jones did not for a moment wish to suggest that Messrs. Ilford were not familiar with the proper use of certain light-filters, and regrets that his article should have given that impression. It is very satisfactory to have their assurance that the lack of perfection in the one example examined is due to the printing and reproduction processes rather than to the photography, owing chiefly to the difficulties in obtaining suitable inks. A reference to Mr. Chapman Jones's article will show that he did not credit anyone with having produced a plate of even sensitiveness throughout the visible normal solar spectrum, or, indeed, the spectrum of any other of the usual light sources. Those who use Ilford X-ray plates will find a pamphlet just issued by the company of considerable service, especially if they have difficulty in getting contrast, or are uncertain as to the best method of treating them. The "Notes" also contain advice as to printing from the plates, and the application of films for dental purposes which are put up in a special manner ready for use. Half a dozen excellent reproductions are included.

THE latest catalogue of Messrs. J. Wheldon and Co., 38 Great Queen Street, W.C.2 (New Series, No. 85), deals with ornithology, and should be of interest and service to many readers of *NATURE*. It contains many first and rare editions, and is conveniently arranged under the headings of British Islands, Cage Birds, Game Birds, etc., Pigeons and Poultry, Europe, Asia, Africa, North America, South America, Australasia, General Systems, etc., Miscellaneous, and Morphology. We notice that Messrs. Wheldon have for disposal many sets and long runs of scientific serials, e.g. the *Ibis*, "British Birds," "Novitates Zoologicae," "Proceedings of the Zoological Society of London," the *Zoologist*, etc. The catalogue is sent post free on receipt of 2d.

OUR ASTRONOMICAL COLUMN.

ELECTRIC-FURNACE SPECTRA.—An important study of the spectra of calcium, strontium, barium, and magnesium, as produced in the electric furnace at temperatures of 1650°, 2000°, and 2350° C., has been made by Dr. A. S. King at the Mount Wilson laboratory (*Astrophys. Journ.*, vol. xlviii, p. 13). The extension of the observations into the ultra-violet has shown that there is a limit beyond which no lines are emitted at a given temperature, and that the limit advances towards shorter wave-lengths with increase of temperature, as in the case of the continuous spectrum of an incandescent solid. The observations bring out very clearly the characteristics of the various lines, and permit their classification in relation to temperature. The line at $\lambda 6573$ is unique among the calcium lines, being faint in the arc and much weaker at high than at low temperatures in the furnace; it is much strengthened in the spectra of sun-spots, and may be used with confidence as a low-temperature indicator. In agreement with previous work, the magnesium line $\lambda 4571$ was also found to be a low-temperature line of extreme type. In the case of barium, there is not merely a sharpening of the lines as compared with the arc, but in several cases there is also a resolution of diffuse arc lines into two or three components; the resolved lines possibly occur among the faint absorption lines of the solar spectrum, suggesting that the

solar conditions in the region where these lines are produced involve a moderately high temperature combined with low pressure.

THE NEBULAR HYPOTHESIS.—The present position of the nebular hypothesis is discussed by Prof. J. H. Jeans in an interesting article which appears in the October issue of *Scientia*. The absence of adequate observational evidence of successive stages in the process conceived by Laplace being possibly due to instrumental limitations, the hypothesis can only be tested by mathematical research on the sequence of configurations of a rotating and condensing mass of gas. On the assumption that the mass is homogeneous and incompressible, it has been shown that systems corresponding closely with binary and multiple stars would be produced. When account is taken of the increase of density towards the centre, only approximate solutions of the problem are available. It appears, however, that for densities greater than one-quarter that of water the result would be very similar to that for an incompressible mass, while for lower densities the form assumed would be that of the lens-shaped figure deduced by Roche. In the latter case, after the attainment of a certain critical velocity, no further change of shape would be produced, but matter would be ejected from the periphery, and, as a result of tidal forces, the ejected matter would take the form of two spiral arms. It can be further shown that these filaments will only break up when they are on a sufficiently massive scale, and that when a reasonable value is assumed for the density of the primitive nebula, the condensation nuclei would be comparable in mass with the sun. It is thus suggested that, while the process imagined by Laplace is quite inapplicable to the solar system, its action is exhibited on a far grander scale in the giant masses of the spiral nebulae; the products of disintegration are not planets and satellites, but streams of stars.

THE PROBLEM OF ADULT EDUCATION.

DURING the Session of 1917 the Minister of Reconstruction, the Rt. Hon. Christopher Addison, appointed a Committee, of which the Master of Balliol is the chairman, "to consider the provision for, and possibilities of, adult education (other than technical or vocational) in Great Britain, and to make recommendations."

The Committee has recently issued a most important interim report (Cd. 9107, price 3d.), which demands the earnest consideration of all who are interested in the industrial, social, intellectual, and moral well-being of the nation.

As a result of its inquiries and of the evidence offered the Committee has come to the conclusion that before the just claims of adult education can be considered and adequately met, it is indispensable to have regard to the industrial and social conditions under which the nation exists. There is unquestionably a wide and growing demand for education for adults of a non-vocational character, with a view to fuller personal development and with the object of promoting a healthier social intercourse and generally of equipping the workers, both men and women, for wider industrial, social, and political responsibilities, so that they may take their full and rightful share in the national life and well-being. It is fully recognised in the report that the development of the education of the child and of the adolescent, foreshadowed by Mr. Fisher's measure, now happily become law, is essential to further opportunities for the continued education of the adult, who will thereby be the better fitted to avail himself of the experiences of life, and to seek and find a wise solution of the